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persons was protected. Nine tide gates were repaired or built, 4.2 miles of new ditches were constructed, and 74.9 miles of existing ditches were cleaned and graded. The total length of ditches oiled during the season amounted to 407 miles, 4,075 gallons of oil being used.

A malaria survey was made in the city of Savannah December 18–23, 1919, by public health nurses, under the direction of the city health officer, for the purpose of determining the malaria prevalence within the city as based on history reports. In this survey different sections of the city were selected. Four hundred and forty-seven families were visited and 1,587 persons interrogated. Of these, 384, or 24 per cent, gave a history of having had malaria within the previous four months, and 55, or 3.5 per cent, had active malaria at the time of the survey. A similar survey was completed on January 20, 1921, in which 3,101 families were visited and 10,313 persons interrogated. This survey showed 456, or 4.4 per cent, with a history of malaria during the previous four months, and 52, or 0.5 per cent, active cases at the time the survey was made. From these surveys it appears that there was approximately five and one-half times as much malaria in Savannah, Ga., in the latter part of 1919, previous to the antimalaria operations, as there was during a similar period in 1920, following these operations.

It was recommended that the city of Savannah set aside $30,000 for the extension and maintenance of antimalaria work during 1921, and assurance has been given that the city officials will continue this work with an adequate appropriation. The Seaboard Air Line and the Central of Georgia Railroads have also agreed to continue their support, and on this basis the United States Public Health Service will provide advisory supervision of malaria operations in and around Savannah during the summer of 1921.

SPLEEN EXAMINATIONS OF SCHOOL BOYS IN MITCHELL COUNTY, GA.

By M. A. Barber, Special Expert, and C. P. Coogle, Acting Assistant Surgeon, United States Public Health Service.

In investigating malaria in Mitchell County, Ga., examinations were made of practically all the school boys in the public schools of Mitchell County, in order to determine what percentage of them showed splenic enlargements, and to what extent this method of examination can be depended upon to reveal the true status of malaria prevalence in a county similar to this. These examinations were made from January 19 to March 14, 1921, the majority of them being made during the month of February.

Examinations.

Method of examination.—Examinations were made of boys only. In some cases the boys were taken into a room by themselves, or the girls requested to leave the room, but it was hardly necessary to separate the boys for examination, since there was practically no exposure of the body. No nurse was employed. One examiner and an assistant to take down names, ages, and other data were all that was necessary. The method of palpation employed in most cases was that used by Ross. (Ross, Ronald, Christophers, S. R., Perry, F. L., Spleen Rate London School Children: Ind. Jour. Med. Res., 1914, vol. 1, p. 385.) The child was made to stand, to lean forward to the right of the examiner, or over the examiner's right knee, and at the same time to look upward. In this manner sufficient abdominal relaxation is attained so that the examiner's right hand is easily passed under the left costal arch. As a control on this method, a second method was used in some of the schools first examined. The child was made to lie on his back on a bench with knees up and head on a small pillow. The palpation was made with the tips of the fingers at the expiration of a deep breath. In both methods the children were directed to relax the abdomen as much as possible, and in both methods sufficient clothing was loosened to allow the hand to come into contact with the skin. In some of the earlier examinations results were checked by two observers and by both methods. The results so obtained by both methods of examination practically agreed. It is inadvisable, of course, to examine children soon after a meal.

Time required for examinations.—In one school 181 boys were examined in about three hours. On another day five different schools were visited and 125 children were examined. In both cases the work was done by one examiner (C. P. C.) with an assistant to take notes. Time can be saved by having the teacher or an older pupil prepare the clothing of the boys. Ross (Ross, Ronald: Prevention of Malaria, New York, 1910, p. 220) states that it is possible to examine 100 children in one hour.

Attitude of teachers and parents.—Examinations were arranged through the county superintendent of schools, and the schools were notified by letter that an examination would be made. In the larger schools the time of examination was arranged with the superintendent of schools or the principal, but in many of the smaller country schools no definite date was arranged for, and the examination was done when most convenient for the examiner to call. Teachers gave the heartiest cooperation, and not one objection came to the examiners from any parent, either on account of blood or spleen examinations.

Results.

In all, 1,261 boys were examined, with a positive spleen rate of 2.1 per cent; 865 white boys gave a positive rate of 2 per cent, and 396 colored a rate of 2.5 per cent. All positives occurred in ages 5 to 14, inclusive. A total of 1,116 boys of these ages gave 27, or 2.4 per cent positive. The positive spleens were, in practically all cases, just palpable, though a few were enlarged one or two fingers' breadth. Estimating that the number examined comprised about one-third of all children of both sexes of these ages living in the county, the probable error by the Poisson-Pearson formula would be only about 1 per cent. Details as to incidence of positives by ages and schools are given in Tables II and III.

Blood examinations.—In three schools (Table I) the spleen examinations were checked by blood examinations for malaria parasites. Blood of both boys and girls was examined; therefore the parasite and spleen ratios are not exactly comparable. However, since of 70 boys and 58 girls examined for malaria parasites the positive percentages were 5.6 and 5.1, respectively, the error due to the inclusion of the girls must be small.

TABLE I.—*Comparison of spleen and parasite rates of certain schools.*

School.	Color.	Spleen rate.			Malaria parasite rate.		
		Number examined, boys.	Number positive.	Per cent positive.	Number examined, boys and girls.	Number positive.	Per cent positive.
Clayton	C	19	1	5.2	22	2	9.1
Lester	W	25	1	4.0	46	1	2.2
Pebble City	W	36	2	5.6	60	4	6.7
Total		80	4	5.0	128	7	5.5

Summary of Results and Discussion.

It is observed that the total spleen rate, 2.1 per cent, is low,[1] and that the parasite rate of the three schools examined is also low, but, in the aggregate, is comparable with the spleen rate of the same schools. It is to be emphasized, however, that these examinations were made at a time when these rates would be expected to be at their minimum; that is, shortly before the malarial season, or at all events, in most cases before the spring rise in the malaria case rate. One of the chief objects of the spleen examination was to ascertain the minimum rate as a basis for comparison with the rate occurring at the height of the malarial season. (*Vide*, Ross, Ronald: Prevention of Malaria, New York, 1910, p. 318.)

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[1] Ross, Christophers, and Perry (*loc. cit.*) found a spleen rate of approximately 1 per cent in 500 London school children, 3 to 10 years of age.

It is to be remembered also that all of these schools examined are situated in a region where quinine treatment and quinine prophylaxis were conducted last summer. In the Branchville, Mount Zion, and Pebble City neighborhoods, for instance, between 40 and 50 per cent of the children had chills last summer, and 80 to 90 per cent of all children of these three neighborhoods took quinine. It will be observed in Table II that no positive spleens were found in the Mount Zion (3 examined) and the Branchville (31 examined) schools, and only 2 in 36 Pebble City boys.

The low spleen rate observed in this comparatively malarious region in winter would indicate that there is at that season no important cause of splenomegaly other than malaria. Should a much higher rate be observed during the malaria season, it is probable that such rate would be due to malaria.

In sum, the chief value of this winter spleen examination is to obtain a basis for the comparison of summer rates; and it seems probable that where a single examination is to be taken as an index of the amount of malaria in a region, that examination should be made at the height of the malaria season.

TABLE II.—*Spleen examination of Mitchell County boys by schools.*

School.	Color.	Date visited.	Number of boys examined.	Number of enlarged spleens found.
Camilla	C.	Jan. 19	77	2
Do	W.	Feb. 7	185	2
Bennet	C.	Jan. 25	14	1
Hall Church	C.	Feb. 2	25	0
Branchville	W.	...do....	18	0
Do	C.	...do....	13	0
Friendship	C.	Feb. 4	17	0
Mount Zion	W.	...do....	3	0
Habakkuk	C.	...do....	13	0
Sales City	W.	Feb. 14	81	0
Oak Grove	C.	...do....	27	1
Hopeful	W.	...do....	46	0
Clayton	C.	...do....	19	1
St. Johns	C.	Feb. 15	11	1
Bennett Grove	C.	...do....	8	0
Live Oak	W.	Feb. 16	8	0
Zion Grove	C.	...do....	37	2
Bethany	W.	Feb. 21	12	1
Mount Olive	W.	...do....	19	2
Bethel	C.	Feb. 22	7	0
Adama	W.	Feb. 23	9	0
Rose Academy	C.	...do....	74	1
Lester	W.	Feb. 24	25	1
Hicksville	C.	...do....	25	3
Flint	W.	...do....	23	2
Vaconton	W.	...do....	23	0
Do	C.	...do....	29	0
Cotton	W.	Feb. 25	36	1
Harmony	W.	Feb. 26	32	0
Laney	W.	Feb. 25	28	0
Pine Cliff	W.	...do....	9	0
Pelham	W.	Feb. 28	181	2
Pebble City	W.	Mar. 3	36	2
Greenough	W.	...do....	22	0
Pleasant Hill	W.	...do....	21	1
Pleasant View	W.	Mar. 14	5	0
Lake Pleasant	W.	...do....	17	0
Hinsonton	W.	...do....	26	1
Total	....	....	1,261	[1] 27

[1] 2.1 per cent.

Total white, 865; 17, or 2 per cent positive.
Total colored, 396; 10, or 2.5 per cent, positive.

TABLE III.—*Spleen examination of Mitchell County boys by age groups.*

Age (years).	Number examined.	Enlarged spleens found.			Age (years).	Number examined. ber.	Enlarged spleens found.		
		Number.	White boys.	Colored boys.			Num-	White boys.	Colored boys.
4	2	0	0	0	15	64	0	0	0
5	11	1	1	0	16	42	0	0	0
6	128	2	0	2	17	22	0	0	0
7	108	4	1	3	18	9	0	0	0
8	130	6	5	1	19	3	0	0	0
9	147	3	1	2	20	1	0	0	0
10	136	2	1	1	21	2	0	0	0
11	139	0	0	0					
12	121	1	1	0	Total, all ages	1,261	27	17	10
13	109	6	5	1					
14	87	2	2	0					

MODERN STEAM LAUNDRY PROCESSES AS A MEANS OF DESTROYING VERMIN.

By W. D. PIERCE, Ph. D., and R. H. HUTCHISON, M. S., Bureau of Entomology, Department of Agriculture; and A. MOSCOWITZ, B. Sc., Second Lieutenant, Q. M. C., U. S. A.

With the establishment of modern steam laundries at cantonments in this country, and of mobile units for overseas service, the question arose as to their usefulness in destroying body lice in clothing. The laundries branch, salvage division, of the quartermasters' corps, in cooperation with the Bureau of Entomology of the United States Department of Agriculture, took up the study of this question, and the work was done by the authors of this article.[1]

The principal problem was to determine whether woolens could be so treated in modern steam laundries as to insure complete destruction of body lice and yet produce no shrinkage or injury to the wool. The body or clothing louse, *Pediculus humanus*, var. *corporis*, was the only species dealt with. The insects used in the experiments were, for the most part, reared material of known age and condition. Both adults and the nits or eggs were obtained from lice reared in wristlets. The wristlet used was a slight modification of Nuttall's wristlet. It consisted of a pill box in which holes had been punched in both top and bottom. Over these openings was pasted a fine grade of chiffon. The boxes were held in place on the arm by elastic bands. Each box contained from 20 to 50 lice, with a bit of flannel cloth to which they could cling and to which they attached their eggs. Every second day the lice were transferred to a clean piece of cloth and returned to the wristlet. The piece of cloth, with attached eggs laid during the preceding 48 hours, was put into a new pill box of the same type. The eggs were counted, the boxes were numbered, and exact records were kept of each lot. These boxes were kept in an electrically heated incubator, at a temperature of about 30° C. and

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[1] The final report was published in full in the National Laundry Journal of Chicago, Jan. 1, 1919, vol. 81, No. 1.